General

Guideline Title

Diagnostic criteria and classification of hyperglycaemia first detected in pregnancy.

Bibliographic Source(s)

World Health Organization (WHO). Diagnostic criteria and classification of hyperglycaemia first detected in pregnancy. Geneva (Switzerland): World Health Organization (WHO); 2013. 62 p. [65 references]

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

The rating schemes for the quality of the evidence (very low, low, moderate, high) and the strength of the recommendations (weak/conditional, strong) are defined at the end of the "Major Recommendations" field.

Classification of Hyperglycaemia First Detected during Pregnancy

Recommendation 1

Hyperglycaemia first detected at any time during pregnancy should be classified as either:

- Diabetes mellitus in pregnancy
- Gestational diabetes mellitus (GDM)

(Quality of evidence: not graded; Strength of recommendation: not evaluated)

Diagnosis of Diabetes Mellitus in Pregnancy

Recommendation 2

Diabetes mellitus in pregnancy should be diagnosed by the 2006 World Health Organization (WHO) criteria for diabetes if 1 or more of the following criteria are met:

- Fasting plasma glucose ≥7.0 mmol/l (126 mg/dl)

- 2-hour plasma glucose ≥11.1 mmol/l (200 mg/dl) following a 75 g oral glucose load
- Random plasma glucose ≥1.1 mmol/l (200 mg/dl) in the presence of diabetes symptoms

(Quality of evidence: not graded; Strength of recommendation: not evaluated)

Diagnosis of Gestational Diabetes Mellitus

Recommendation 3

The diagnosis of GDM at any time during pregnancy should be based on any 1 of the following values:

- Fasting plasma glucose = 5.1–6.9 mmol/l (92–125 mg/dl)
- 1-hour post 75 g oral glucose load ≥10.0 mmol/l (180 mg/dl)*
- 2-hour post 75 g oral glucose load 8.5–11.0 mmol/l (153–199 mg/dl)

*There are no established criteria for the diagnosis of diabetes based on the 1-hour post-load value.

(Quality of evidence: very low; Strength of recommendation: weak)

Definitions:

Quality of Evidence

High: Further research is very unlikely to change confidence in the estimate of effect.

Moderate: Further research is likely to have an important impact on confidence in the effect.

Low: Further research is very likely to have an important impact on estimate of effect and is likely to change the estimate.

Very Low: Any estimate of effect is very uncertain.

Strength of Recommendations

The strength of recommendations is stated only for recommendations arrived at by the Grading of Recommendations Assessment, Development and Evaluation (GRADE) process.

Strong: Moderate or high quality evidence of effectiveness for at least one critical outcome, desirable effects judged to outbalance the undesirable, or very low quality evidence on undesirable effects; can be adopted in most settings.

Weak/conditional: Low or very low quality evidence of effectiveness for all critical outcomes, small benefits, or harms judged to dominate over benefits; questionable feasibility in low-resource settings.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Hyperglycaemia detected during pregnancy (gestational diabetes mellitus [GDM] or diabetes mellitus during pregnancy)

Guideline Category

Diagnosis

Risk Assessment

Screening

Clinical Specialty

Endocrinology

Family Practice

Nursing

Obstetrics and Gynecology

Intended Users

Advanced Practice Nurses

Health Care Providers

Nurses

Other

Physician Assistants

Physicians

Public Health Departments

Guideline Objective(s)

To update the 1999 World Health Organization (WHO) recommendations for diagnosing and classifying hyperglycaemia in pregnancy

Target Population

Women with hyperglycaemia detected during pregnancy

Interventions and Practices Considered

1. Classification of hyperglycaemia first detected in pregnancy
2. Diagnosis of diabetes in pregnancy according to 2006 World Health Organization (WHO) criteria for diabetes using:
    - Fasting plasma glucose
    - 2-hour plasma glucose following a 75 g oral glucose load
    - Random plasma glucose
3. Diagnosis of gestational diabetes mellitus (GDM)
    - Fasting plasma glucose
    - 1-hour plasma glucose following a 75 g oral glucose load
    - 2-hour plasma glucose following a 75 g oral glucose load

Major Outcomes Considered

- Large for gestational age births and macrosomia
- Perinatal mortality (fetal death and early neonatal death)
- Preeclampsia
- Caesarean section delivery

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Note from the National Guideline Clearinghouse: This guideline is based on two systematic reviews commissioned by the World Health Organization (WHO) (see the "Availability of Companion Documents" field).

Identification and Generation of Evidence

The following databases were searched for publications on the relationship between glycaemia in pregnancy and various maternal and child outcomes up to March 2011: MEDLINE, EMBASE, Latin American and Caribbean Health Sciences Literature (LILACS), the Cochrane Library, Cumulative Index to Nursing and Allied Health Literature (CINAHL), WHO-AFRO library, Index Medicus for South-East Asia Region (IMSEAR), EMCAT, Index Medicus for the Eastern Mediterranean Region (IMEMR) and Western Pacific Region Index Medicus (WPRIM) without language, time of publication or country restrictions. No systematic reviews were identified and a systematic review was commissioned from the Universidade Federal do Rio Grande do Sul, Porto Alegre and Universidade Federal de São Paulo, São Paulo, Brazil (see the "Availability of Companion Documents" field for the full article).

For the effect of treating hyperglycaemia in pregnancy compared with usual antenatal care the following databases were searched up to February 2012: African Index Medicus; CENTRAL; ClinicalTrials.gov register; WHO.int trial search; EMBASE; IMEMR; IMSEAR; Indian Medical Journals (IndMED); ISI Web of Knowledge; KoreaMed; LILACS; Panteleimon; PubMed; WPRIM without language, country or time of publication restrictions. Two recent systematic reviews were identified. However, to gain a more global and broader perspective, and to be able to include the critical outcome of perinatal mortality, not directly addressed in these systematic reviews, a new systematic review, which also included older trials using quasi-randomization, was commissioned from the Universidade Federal do Rio Grande do Sul and the Universidade Federal de São Paulo (see the "Availability of Companion Documents" field for the full article). The same institution performed a modelling study based on data derived from these two systematic reviews to compare the impact of applying the 1999 WHO criteria and the International Association of Diabetes and Pregnancy Study Groups (IADPSG) criteria in a universal screening programme.

The researchers of the Hyperglycemia and Adverse Pregnancy Outcomes (HAPO) Study provided results of additional analyses of the dataset as requested by the guideline development group.

Gestational Diabetes and Pregnancy Outcomes - a Systematic Review of the World Health Organization (WHO) and the International Association of Diabetes in Pregnancy Study Groups (IADPSG) Diagnostic Criteria

Criteria for Considering Studies for This Review

Types of Study

Cohort studies (prospective or retrospective) were considered for inclusion in this systematic review if they provided sufficient information to estimate the associations of the WHO and/or the IADPSG criteria with related perinatal and maternal outcomes. To avoid selection bias, reviewers included only studies that applied the oral glucose tolerance test (OGTT) universally to all participants. They therefore excluded studies applying the OGTT only in women with certain clinical risk factors (such as family history, obesity, previous gestational diabetes mellitus [GDM]) or in those positive in pre-OGTT glucose screening (with, for example, a 50 g challenge test and/or a fasting glucose). Also excluded were studies that did not distinguish pre-gestational diabetes mellitus from GDM, those not allowing the distinction between treated and untreated groups, and those not reporting outcomes for women classified as having a normal OGTT.

Types of Participants

The reviewers accepted studies which included women of any race, parity, age, body weight or other socio-demographic characteristics.

Types of Diagnostic Tests

Only studies based on a 2-hour 75-g OGTT performed during the second or the third trimesters were included, and only if they provided results for a diagnosis based on at least the 2-hour post-load glucose. Studies based on capillary glucose measurements were included.

Types of Outcome Measures

The reviewers decided to analyze, as perinatal outcomes, large for gestational age births and macrosomia (as defined by the authors), as well as perinatal mortality (fetal death and early neonatal death). Regarding maternal outcomes, they chose to analyze cesarean delivery and preeclampsia according to individual study definitions.

Search Methods for the Identification of Studies

The search strategy used the following general terms, adapted to each database: "gestational diabetes" or "glucose intolerance" and the appropriate terms for each of the maternal and perinatal adverse outcomes specified above. Specific terms used for the electronic search are detailed in the "Additional file 1: Description of the electronic search strategy used to perform the literature search" (see the "Availability of Companion Documents" field).

Ten electronic databases (MEDLINE, EMBASE, LILACS, the Cochrane Library [CENTRAL], CINHAL, WHO-Afro library, IMSEAR, EMCAT, IMEMR and WPRIM) were searched for articles published from inception up to March 15, 2011. No language or country restrictions were applied. The reviewers also searched for additional studies from classical review articles. The reference lists of all articles selected for full text reading were reviewed for additional potentially eligible studies.

Selection of Studies

All citations identified were entered into an electronic database and duplicates were deleted. Initially, two investigators independently screened the titles and abstracts of potentially relevant studies for eligibility. When the information was not sufficient to determine if the article was eligible for inclusion, the article's full text was obtained for further evaluation. Discrepancies were discussed until consensus was reached.

Effectiveness of Gestational Diabetes Treatment: a Systematic Review with Quality of Evidence Assessment

Eligibility Criteria

The reviewers included controlled clinical trials comparing GDM treatment to usual antenatal care for pregnant women with a diagnosis of GDM according to the individual study definitions. No restrictions were made regarding language, or publication date or status.

In accordance with the Cochrane Handbook for Systematic Reviews of Interventions, they included studies with random allocation or systematic quasi-random allocation, such as alternation. They excluded experimental studies using non-systematic treatment allocation methods such as clinician judgment, subject preference or availability of the intervention.

Outcomes of Interest

Outcomes were extracted according to the study author's definitions, which varied for most outcomes. Perinatal outcomes were perinatal mortality, macrosomia, large for gestational age and small for gestational age birth, neonatal intensive care unit admission, congenital abnormalities, preterm birth, birth trauma (defined as bone fracture or brachial plexus palsy), shoulder dystocia, neonatal hypoglycemia, hyperbilirubinemia and respiratory distress syndrome.

Maternal outcomes were maternal mortality, preeclampsia and hypertensive disorders in pregnancy, caesarean section and diabetes later in life.

Literature Search and Study Selection

The search strategy used the following general terms, adapted to each database: "gestational diabetes", "random*", "controlled clinical trial", "diabet*" and "pregnan*". Terms used for the electronic search are detailed in Supplementary Table 1. The reviewers searched 14 electronic databases (African index medicus; CENTRAL; http://ClinicalTrials.gov register; EMBASE; IMEMR; IMSEAR; IndMED; ISI Web of Knowledge; KoreaMed; LILACS; Panteleimon; PubMed; http://WHO.int trial search; and WPRIM) for articles published from inception up to February 2012.

They also searched for additional studies by reviewing the reference lists of review articles and of controlled clinical trials, including the list of excluded studies from other systematic reviews.

All citations identified were entered into an electronic database, and duplicates were deleted. Initially, two investigators independently screened

potentially relevant studies through the titles and abstracts. When the information was not sufficient to determine if the article was eligible for inclusion, a full text was obtained for further evaluation. Discrepancies were discussed until consensus was reached.

Number of Source Documents

Gestational Diabetes and Pregnancy Outcomes - a Systematic Review of the World Health Organization (WHO) and the International Association of Diabetes in Pregnancy Study Groups (IADPSG) Diagnostic Criteria

The search identified 5985 references, without duplicates. Nine citations were retrieved from the reference lists of the full-text articles. After revising all titles and abstracts, 202 potentially relevant citations were identified and full papers were obtained for all. A total of 9 publications pertaining to 8 studies met the selection criteria and were included in this systematic review. For a description of excluded studies, see "Additional file 2: List of excluded articles" (see the "Availability of Companion Documents" field).

Effectiveness of Gestational Diabetes Treatment: a Systematic Review with Quality of Evidence Assessment

After excluding duplicates, the search identified 3817 references. The reviewers reviewed all titles and abstracts, identifying 42 potentially relevant studies to be assessed by full text. A total of 8 publications pertaining to 7 studies met the selection criteria and were included in this systematic review, totaling 3157 women randomized (Supplementary Fig. 1). The list of excluded studies (and reasons for exclusions) is available in Supplementary Table 2.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Quality of Evidence

High: Further research is very unlikely to change confidence in the estimate of effect.

Moderate: Further research is likely to have an important impact on confidence in the effect.

Low: Further research is very likely to have an important impact on estimate of effect and is likely to change the estimate.

Very Low: Any estimate of effect is very uncertain.

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Note from the National Guideline Clearinghouse: This guideline is based on two systematic reviews commissioned by the World Health Organization (WHO) (see the "Availability of Companion Documents" field).

Gestational Diabetes and Pregnancy Outcomes - a Systematic Review of the World Health Organization (WHO) and the International Association of Diabetes in Pregnancy Study Groups (IADPSG) Diagnostic Criteria

Data Extraction and Management

Two independent investigators reviewed the eligible studies and extracted data using a standardized form prepared for this review. Disagreements were discussed and resolved in a consensus meeting. When raw quantitative data were not reported, approximate values were obtained from the figures or calculated from percentages.

Assessment of Methodological Quality

The methodological quality of the included studies was assessed by examining factors which might affect the strength of the association between glucose levels and outcomes. In particular, the following factors were assessed in each study: i) adequate selection of participants: consecutive recruitment from prenatal clinics; ii) adequate standardization of the glucose tolerance test (pre-analytic factors such as anhydrous glucose, plasma immediately separated or kept with glycolytic inhibitors and kept refrigerated until centrifugation; and analytic factors such as enzymatic method of measurement and laboratory quality control); iii) adequate report of losses to follow up and; iv) medical staff blinded to oral glucose tolerance test (OGTT) results.

Data Synthesis

Data for the WHO and the IADPSG criteria were aggregated and presented as relative risk (RR) with 95% confidence interval (CI). Meta-analysis data were combined using random-effect models, with restricted maximum likelihood (REML) estimation. The statistical analysis was performed using the R version 2.11.1 software, package metafor version 1.6-0. As the aim was to investigate diagnostic criteria based on their capacity to predict gestational diabetes mellitus (GDM)-related outcomes for classification purposes rather than for etiological investigation, all statistical analyses were crude, without adjustment for potential confounders.

Assessment of Heterogeneity

Overall results were calculated based on the random effects model. Heterogeneity was assessed using the Cochrane's chi^2 statistics with a significance level of 0.10. Inconsistency indexes (I^2) were also calculated, and a value greater than 50% was considered an indicator of high inconsistency between studies.

Sensitivity Analysis and Assessment of Publication Bias

The reviewers did sensitivity analyses in order to examine the influence of the HAPO study and Brazilian Study of Gestational Diabetes (EBDG) on the magnitude and consistency of associations with outcomes. In addition to REML, reviewers also aggregated data with other variance estimators (Maximum Likelihood, Empirical Bayes, Sidik-Jonkman and DerSimonian and Laird) and with a fixed effect model in order to assess the robustness of the model.

Publication bias was tested using a funnel plot and Egger's test based on weighted regression. The full database for the EBDG study was available which allowed analysis for both criteria for all outcomes. The EBDG study was approved by local institutional review boards and informed consent was obtained from all participants. Data from the other studies were obtained from published articles cited in the list of references.

Effectiveness of Gestational Diabetes Treatment: a Systematic Review with Quality of Evidence Assessment

Data Management

Two independent investigators reviewed the eligible studies and extracted data using a standardized form. Information extracted from each individual trial consisted of: (1) characteristics of trial participants (population source, age, ethnicity and pre-gravid body mass index [BMI]); (2) diagnostic procedures (type of test used, gestational age at testing, GDM diagnostic criteria and results for oral glucose tolerance and glucose challenge tests); (3) type of intervention (treatment performed and number of women requiring use of anti-diabetics); (4) outcome measures and their definition according to individual studies; and (5) methodological quality of data, as explained below.

Disagreements were discussed until consensus was reached. When quantitative data were not reported, approximate values were obtained from the figures or calculated from proportions.

Data Analysis

Data were combined using random-effect meta-analysis models, with REML variance estimator and presented as RR with 95% CI. Most statistical analyses were performed using the R version 2.11.1 software, package metafor version 1.6-0. For trial sequential analysis, TSA software was used. To evaluate the impact of treatment, we estimated the number needed to treat (NNT).

The reviewers assessed heterogeneity using a standard χ^2 test with a significance level of 0.10. In view of the low power of such tests, they also examined heterogeneity with the I^2 statistic, where I^2 greater than 50% was considered an indicator of high inconsistency across studies. Since they included trials with quasi-random allocation methods, sensitivity analysis was performed stratifying studies according to allocation concealment quality for all available outcomes.

In addition to REML, they also aggregated data with other variance estimators (maximum likelihood, empirical Bayes, Sidik–Jonkman, and

DerSimonian and Laird) and with a fixed effect model, in order to assess model robustness. Trial sequential analysis was performed for macrosomia, large for gestational age birth, hypertensive disorders in pregnancy and caesarean section in order to determine the sufficiency of the available data. The observed rates in the control groups were used to estimate the incidence of outcomes, as well as their consistency across studies. In these analyses, statistical power was defined as 80% for an alpha of 5%, assuming relative risk reduction (RRR) of 35% for macrosomia, 35% for large for gestational age birth, 25% for hypertensive disorders in pregnancy, and 20% for caesarean section.

Publication bias was evaluated using funnel plots and Egger's test based on weighted regression for outcomes with at least five studies. Adjustment for publication bias with the trim and fill method was performed as needed.

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Formulation of Recommendations and Decision Making

The recommendations were formulated by the co-chairs and discussed at two group meetings and by e-mail communication. The diagnostic cut-off plasma glucose values for gestational diabetes mellitus (GDM) are based on Grading of Recommendations Assessment, Development and Evaluation (GRADE) evidence tables. The GRADE process was not used for the recommendations on classification of hyperglycaemia first detected in pregnancy due to limitations of GRADE for this purpose, nor for diagnostic criteria for diabetes first diagnosed in pregnancy, due to lack of data on the relationship between glycaemia and specific chronic diabetic complications throughout the glycaemic range in untreated pregnant women. Consensus was a priori defined as agreement of a large majority of guideline group members, without strong disagreements. If the group members were unable to reach consensus, the recommendation would be put to a vote and would stand if voted for by a simple majority and the dissenting views presented in the report. However, the group reached consensus on every recommendation.

Risks and Benefits, Values and Preferences

The Guideline Development Group (GDG) considered potential benefits (to mother and child) of adopting the new criteria in the prevention of short-term pregnancy and perinatal outcomes. Potential long-term benefits to the health of the mother and her offspring were not considered given the paucity of the data available.

The GDG did not evaluate potential risks of treating GDM, with the exception of delivering low birth weight and premature delivery. There are no data on the consequences of false positive or false negative test results, nor on whether or not the (arguably minor) inconveniences/harms of an oral glucose load and blood sampling outweigh the benefits of diagnostic testing.

Potential negative effects of adopting the new diagnostic criteria on the personal satisfaction, quality of life or psychological aspects of individual patients were not evaluated as data on this still have to emerge following eventual implementation of the new criteria. The cost-effectiveness of using these diagnostic criteria will depend on underlying population glucose intolerance and whether the test will be used for diagnostic testing only, or for screening of various scope (testing all pregnant women, testing "at high risk" women only). The cost-effectiveness data are yet to emerge.

The GDG estimated the impact of adopting the new criteria on the incidence of adverse outcomes of GDM and on the number needed to screen to prevent one potential adverse outcome.

The values and preferences accounted for in the decision making process were those of the GDG given that several of its members are women and the impracticality of including pregnant women in the lengthy guideline development process. Data on the preference of pregnant women for a particular diagnostic test are unavailable. Based on their clinical experience, the GDG considered that pregnant women were more concerned about the outcome of their pregnancy than by the relatively minor inconveniences of diagnostic testing labelling and possible treatment of limited duration.

Rating Scheme for the Strength of the Recommendations

Strength of Recommendations

The strength of recommendations is stated only for recommendations arrived at by the Grading of Recommendations Assessment, Development and Evaluation (GRADE) process.

Strong: Moderate or high quality evidence of effectiveness for at least one critical outcome, desirable effects judged to outbalance the undesirable, or very low quality evidence on undesirable effects; can be adopted in most settings.

Weak/conditional: Low or very low quality evidence of effectiveness for all critical outcomes, small benefits, or harms judged to dominate over benefits; questionable feasibility in low-resource settings.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

External Peer Review

Description of Method of Guideline Validation

The draft recommendations were reviewed by 6 experts and suggestions considered by the majority of the guideline development group as relevant were included in the document. The experts' participation in the peer review of the guideline was approved by the World Health Organization (WHO) Office of the Legal Counsel.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- Prevention of adverse pregnancy and perinatal outcomes, including macrosomia, large for gestational age, shoulder dystocia and pre-eclampsia/hypertensive disorders in pregnancy
- Potential long-term benefits to the health of the mother and her offspring were not considered given the paucity of the data available.

Potential Harms

- Testing early in the first trimester using a fasting plasma glucose cut-point of 5.1 mmol/l (92 mg/dl) might overdiagnose gestational diabetes mellitus (GDM) in non-obese women who have values close to the cut-point. On the other hand, higher first trimester fasting plasma glucose levels (but lower than those diagnostic of diabetes) are associated with increased risks of later diagnosis of GDM and adverse pregnancy outcomes. Currently it is not known whether there is benefit of diagnosing and treating GDM before the usual window of 24 to 28 weeks gestation.
- These new criteria are expected to increase the number of women identified with GDM and consequently increase the burden on the health system. Possible harms include more intensive surveillance during pregnancy and a higher rate of primary caesarean deliveries; labeling or treatment of gestational glucose intolerance, maternal anxiety and health perception, although scant available data indicate no increased anxiety. There are no data on the consequences of false positive or false negative test results, nor on whether or not the (arguably minor) inconveniences/harms of blood sampling outweigh the benefits of diagnostic testing.

Qualifying Statements

Qualifying Statements

- The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization (WHO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.
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Implementation of the Guideline

Description of Implementation Strategy

Adaptation and Implementation

The diagnostic test is simple and the implementation of diagnostic criteria and classification is conditional on availability of plasma glucose measurement which could be a problem in low-resource settings. The World Health Organization (WHO) Action Plan for noncommunicable diseases supports member states in improving access to essential technologies for diagnosis and monitoring of major noncommunicable diseases and their risk factors. Measurement of plasma glucose values can be used for screening as well as diagnosis of any hyperglycaemic state. The design and implementation of programs to screen for and treat women with hyperglycaemia first detected during pregnancy will need to be determined by individual countries and health services taking into consideration prevalence of glucose intolerance in the population, resources and competing priorities. WHO will provide technical advice in this process.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Timeliness

Identifying Information and Availability

Bibliographic Source(s)

Bibliographic Source(s)

World Health Organization (WHO). Diagnostic criteria and classification of hyperglycaemia first detected in pregnancy. Geneva (Switzerland): World Health Organization (WHO); 2013. 62 p. [65 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2013

Guideline Developer(s)

World Health Organization - International Agency

Source(s) of Funding

This work was funded by the Government of Japan. The donor has had no influence on the guideline development.

Guideline Committee

Guideline Development Group

Composition of Group That Authored the Guideline

External Experts: Dr Mukesh M. Agarwal, Faculty of Medicine, UAE University, Al Ain, United Arab Emirates; Dr Michel Boulvain, Service d'obstétrique Maternité HUG, Faculty of Medicine, University of Geneva, Switzerland; Dr Edward Coetzee, Dept Obstetrics & Gynaecology, Groote Schuur Hospital, University of Cape Town, South Africa; Dr Stephen Colagiuri, Boden Institute of Obesity, Nutrition and Exercise, The University of Sydney, Australia; Dr Maicon Falavigna, Post Graduate Program in Epidemiology, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil; Dr Moshe Hod, Helen Schneider Hospital for Women, Rabin Medical Center, Sackler Faculty of Medicine, Tel-Aviv University, Petah-Tiqva, Israel; Dr Sara Meltzer, Departments of Medicine and Obstetrics and Gynaecology, McGill University, Montreal, Canada; Dr Boyd Metzger, Northwestern University, Feinberg School of Medicine, Chicago, United States of America; Dr Yasue Omori, Tokyo Women's Medical University, Diabetes Center, Ebina General Hospital, Tokyo, Japan; Dr Ingvars Rasa, Riga East Clinical University Hospital, Riga Stradin's University, Riga, Latvia; Dr Maria Inês Schmidt, University of Rio Grande do Sul, Porto Alegre, Brazil; Dr Veerasamy Seshiah, Diabetes Research Institute and Dr Balaji Diabetes Care Centre, Chennai, India; Dr David Simmons, Institute of Metabolic Science, Cambridge University Hospitals, National Health Services Foundation Trust, Cambridge, United Kingdom; Dr Eugene Sobngwi, Faculty of Medicine and Biomedical Sciences, University of Yaoundé 1, Cameroon, and Institute of Health and Society, Newcastle University, UK; Dr Maria Regina Torloni, Department of Obstetrics, São Paulo Federal University, Brazil; Dr Huixia Yang, Peking University First Hospital, Beijing

Observer: Dr V. Balaji, Diabetes Research Institute and Dr Balaji Diabetes Care Centre, Chennai, India

WHO Guideline Steering Group: Dr Shanthi P.B. Mendis, Coordinator, Chronic Diseases Prevention and Management; Dr Gojka Roglic, Medical Officer, Chronic Diseases Prevention and Management; Dr Mario Merialdi, Coordinator, Reproductive Health and Research; Dr Ana Pilar Betran, Medical Officer, Reproductive Health and Research

Financial Disclosures/Conflicts of Interest

All experts who participated in the development of this guideline were required to complete the World Health Organization (WHO) Declaration of

Interests form and declare their interest at the meeting. Out of the 15 participating experts, 8 experts declared an interest in the subject matter of the meeting:

- Dr Edward Coetzee has reviewed a technical report on diabetes in pregnancy for the International Diabetes Federation. He has not received payment for this work.
- Dr Sara Meltzer has participated, as the chair and representative of the Canadian Diabetes in Pregnancy Interest Group, in the Consensus Panel that developed the 2010 Recommendations on the Diagnosis and Classification of Hyperglycemia in Pregnancy for International Association of Diabetes and Pregnancy Study Groups. As a member of the Expert Review Committee for the International Diabetes Federation (IDF) Clinical Guidelines Task Force, she participated in the development of the 2009 Global Guideline on Pregnancy and Diabetes. She has received no payment for this work.
- Dr Veerasamy Seshiah: His institution, the Dr Balaji Diabetes Care Centre, has received funding, in the amount of USD 5217 per year for a period of 3.5 years, from the World Diabetes Foundation for a study on the screening for gestational diabetes in Tamil Nadu.
- Dr David Simmons has received financial support (in the amount of approximately GBP 1000) to cover his attendance at the annual meeting of the American Diabetes Association 2010, from the company Novo Nordisk. In addition, in 2007, the Eli Lilly Foundation has paid Dr Simmons consulting fees in the amount of GBP 2500 for the creation of a patient advisory group.
- Dr Eugene Sobngwi has received an honorarium of EUR 1800 from Novo Nordisk for his membership on the advisory board of the Diabetes Attitudes, Wishes and Needs (DAWN-2) Study funded by Novo Nordisk and conducted by questionnaire.
- Dr Boyd Metzger chaired the guideline development group of the International Association of Diabetes and Pregnancy Study groups (IADPSG) that has issued recommendations on diagnosing and screening for GDM. He has not received payment for this work.
- Dr Maria Inês Schmidt was part of the guideline development group of the International Association of Diabetes and Pregnancy Study groups (IADPSG) that has issued recommendations on diagnosing and screening for GDM. She also participated in the development of the 2009 Global Guideline on Pregnancy and Diabetes for the IDF Clinical Guidelines Task Force. She has not received payment for this work.
- Dr Stephen Colagiuri has written a technical report on diabetes in pregnancy for the International Diabetes Federation. He has not received payment for this work.

The experts' participation in the guideline development group was approved by the WHO Office of the Legal Counsel. All external members of the guideline development group participated in the discussions and in the formulation of the recommendations, as there was no objection from GDG members.

All peer reviewers of this guideline were required to complete the WHO Declaration of Interests form. Two experts declared an interest:

- Dr Anne Karen Jenum has received financial support for research (in the amount of 25000 Euros) and honoraria for lectures (in the amount of 500 Euros) from the Norwegian Diabetes Association. She has received honoraria for lectures (in the amount of 500 Euros per year) from various pharmaceutical companies, and has had her travel to major diabetes congresses paid by pharmaceutical companies in 2008 and 2010.
- Dr Gloria Lopez Stewart has reviewed the 2009 IDF Global Guidelines on Diabetes and Pregnancy. She has not received payment for her work.

The experts' participation in the peer review of the guideline was approved by the WHO Office of the Legal Counsel. See the original guideline document for affiliations.

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Electronic copies: Available from the World Health Organization (WHO) Web site .

Print copies: Available from the WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland; Phone: +41 22 791 3264; Fax: +41 22 791 4857; E-mail: bookorders@who.int.

Availability of Companion Documents

The following are available:

- Wendland EM, Torloni MR, Falavigna M, Trujillo J, Dode MA, Campos MA et al. Gestational diabetes and pregnancy outcomes - a systematic review of the World Health Organization (WHO) and the International Association of Diabetes in Pregnancy Study Groups (IADPSG) diagnostic criteria. BMC Pregnancy Childbirth 2012;12(1):23. Electronic copies: Available from the BioMed Central (BMC) Pregnancy and Childbirth Web site . Additional files 1, 2 and 3 for this systematic review are also available from the BMC Pregnancy and Childbirth Web site .
- Falavigna M, Schmidt MI, Trujillo J, Alves LF, Wendland ER, Torloni MR et al. Effectiveness of gestational diabetes treatment: a systematic review with quality of evidence assessment. Diabet Res Clin Pract. 2012 Dec;98(3):396-405. Electronic copies: Available for purchase from the Diabetes Research and Clinical Practice Web site .
- WHO handbook for guideline development. Geneva (Switzerland): World Health Organization (WHO); 2014. 167 p. Electronic copies: Available from the WHO Web site .

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on March 24, 2015.

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